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Invasive alien species of European Union concern: the use of a faunistic database for the knowledge and future management at a local scale

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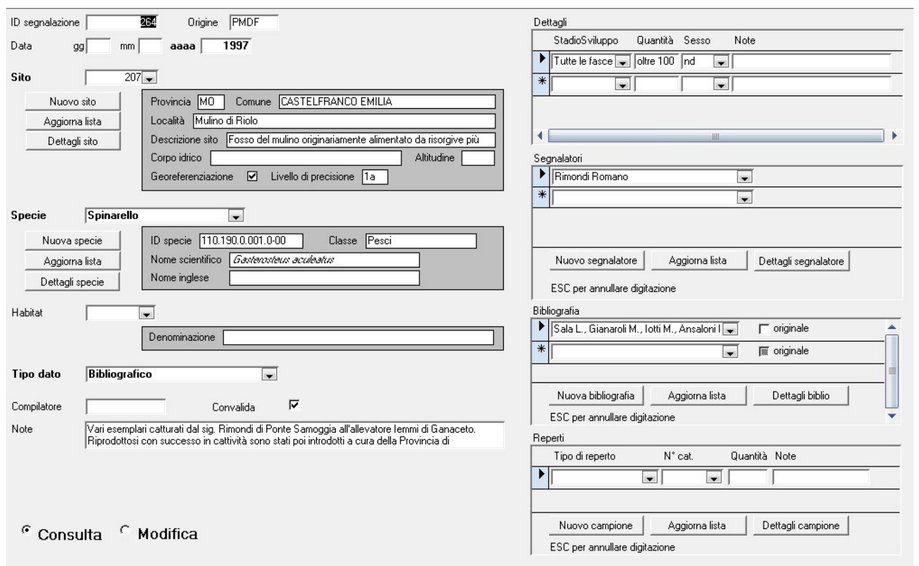
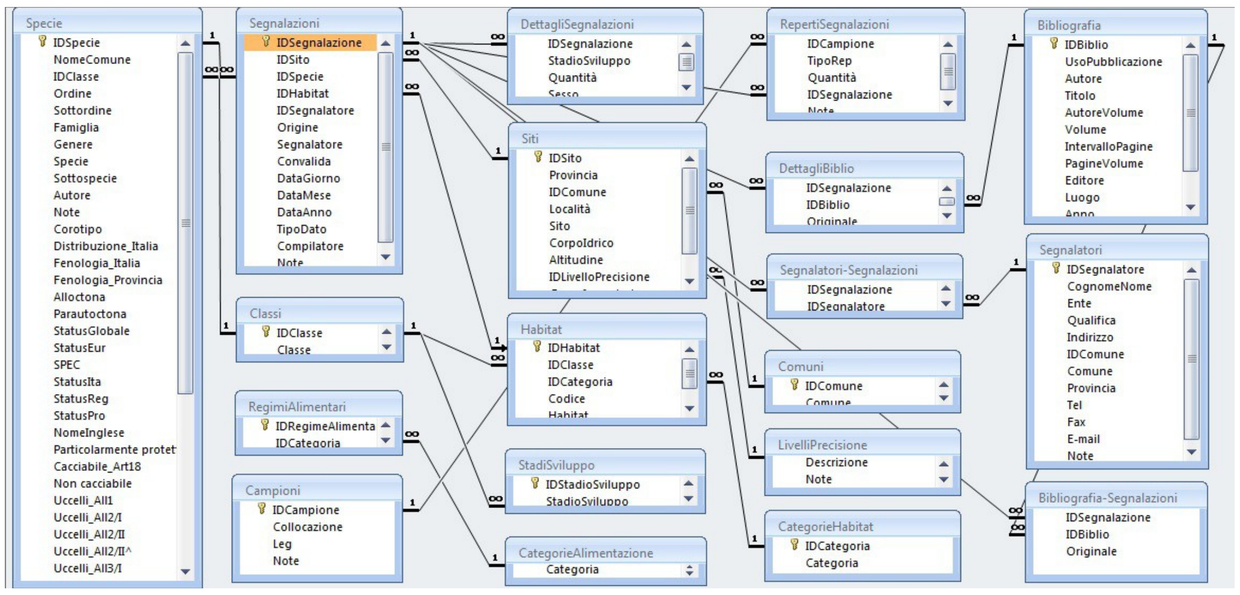
A research group of the Department of Life Sciences, University of Modena and Reggio Emilia, with the contribution of the Province of Modena and the Emilia-Romagna Region, implemented a faunistic database named "Darwin". The database gathers information chiefly on the vertebrate fauna of the province of Modena (Northern Italy). It aims to collect faunistic data extremely heterogeneous in terms of date of collection, precision and collection technique. It ranges from bibliographic information of XIX century to recent data collected with the high accurancy of gps instruments.



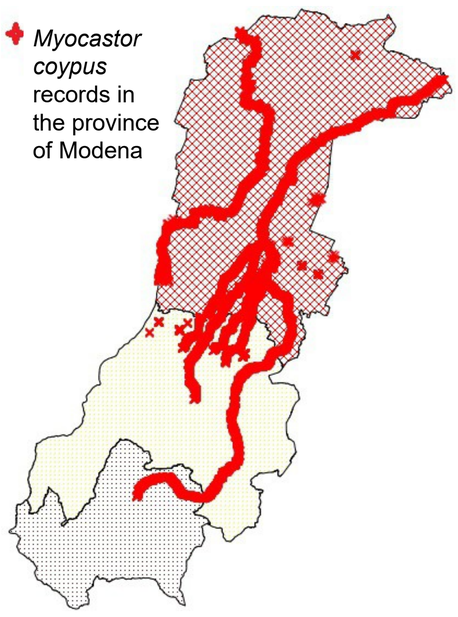
Name of the species, locality, date, datatype and operator are the mandatory data for the records. Other data can be optionally added (habitat type, number of individuals, gender, age, etc.).

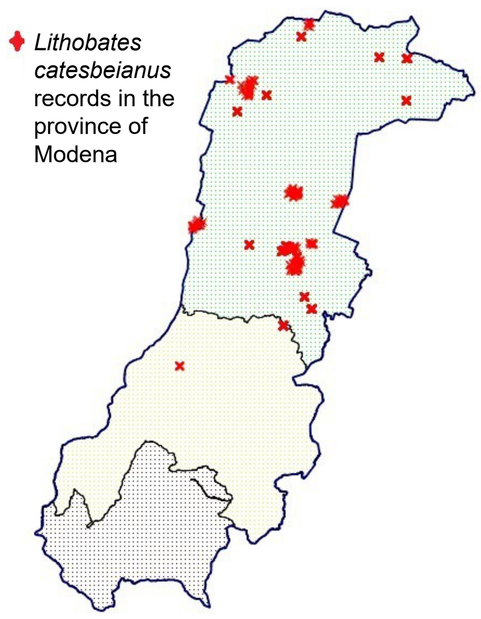


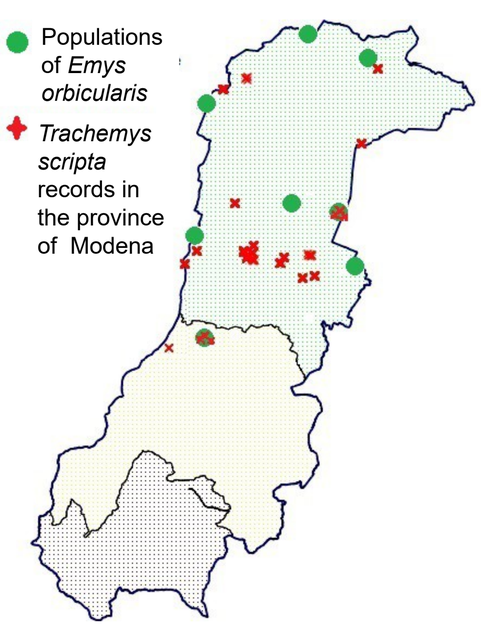
Darwin is structured according a set of tables linked together by means of key fields. The main table is the record table.

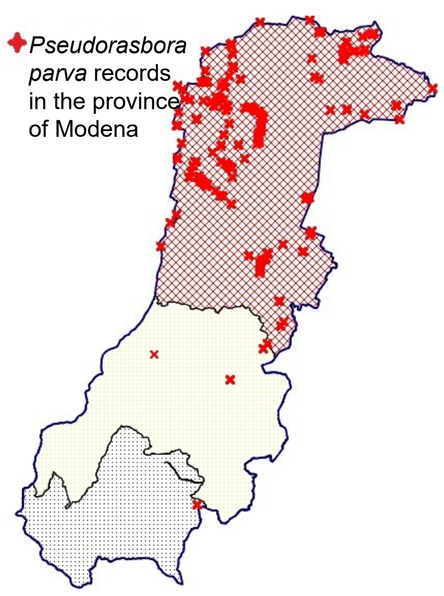
To date, over 24,000 historical and recent records have been collected, regarding 555 vertebrate species and 7 invertebrates (Bivalvia and Crustacea) of high managing interest. Darwin allows to register the modification of the local fauna, with regards to the most problematic taxa and especially to the allochthonous species, which are mainly organisms living in the lowlands that became invasive at different levels. Some of these assumed the role of key species in a variety of ecosystems (e.g., *Pseudorasbora parva*), some threaten certain autochthonous species already at risk (e.g., *Trachemys scripta* and *Procambarus clarkii*), others give rise to economic issues (e.g., *Myocastor coypus*), whilst the remaining ones have progressively lost their invasivity, becoming rare or sporadic (e.g., Ictalurus melas and *Lepomis gibbosus*).

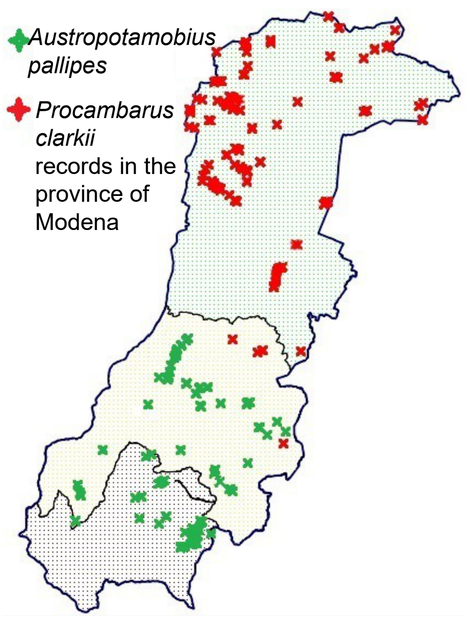
The database represents a strongly effective tool for the basic knowledge functional to the actions deriving from the European Regulation 2014/1143, regarding the recent "List of invasive alien species of Union concern" (EU 2016/1141). Overall, Darwin collects information on the local distribution of 34 invasive allochthonous species, 7 of which of Union concern, namely: *Lithobates catesbeianus, Myocastor coypus, Procambarus clarkii, Pseudorasbora parva, Trachemys scripta, Threskiornis aethiopicus,* and *Oxyura jamaicensis.*
The first four species are established within the province, while *T. scripta* is diffused but not definitively confirmed as breeding, *T. aethiopicus* is present but not breeding, and *O. jamaicensis* is observed only occasionally.











Thanks to the database the autochthonous species of EU interest comprised in the national IUCN Red list and their competitors could be brought into focus. For instance, we revealed the presence of merely 8 local populations of *Emys orbicularis*, threatened by the wide distribution of *T. scripta*, which is reported from over 20 sites within Modena's territory.
Furthermore, we found *Austropotamobius pallipes* at 75 mid-elevation sites (100-1100 m a.s.l.), whilst its direct competitor *P. clarkii*, currently expanding to the foothills, was recorded from 102 locations from 10 to 100 m a.s.l. These preliminary results highlight the necessity of control plans towards the two alien species, which could be developed on the basis of the already available distribution patterns.

Our research group aims at the constant implementation of the database by adding information from ongoing and forthcoming studies on species of major interest. The existing data, presently used in various control plans, will pave the way to more specific investigations on the invasive alien fauna and increase the effectiveness of future managing actions.